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Inventor: Uma Arun

Title: ALGORITHM FOR INTELLIGENT SPEECH
RECOGNITION

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Examiner: Natalie Lennox

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APPEAL BRIEF

Board of Patent Appeals and Interference
US Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

The Appellant is currently appealing the rejections made in the final Office Action dated August 28, 2007. In that Office Action, claims 1-25 were rejected under 35 U.S.C. §103(a). The Appellant respectfully traverses and appeals those rejections.

(i) Real Party in Interest

The real party in interest is the assignee of the appellant inventor who assigned all of his right, title and interest to General Motors Corporation, a Michigan corporation, having its principal place of business at 300 Renaissance Center, Detroit, Michigan 48265-3000.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences known to the Appellant, his assignee, and/or legal representatives that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(iii) Status of Claims

In the Final Office Action, claims 1-25 were rejected under 35 U.S.C. §103. The application does not contain any other claims. This appeal covers the rejections of claims 1-25.

(iv) Status of Amendments

No amendment to the claims has been entered subsequent to the final Office Action.

(v) Summary of Claimed Subject Matter**Independent Claim 1 –**

Independent claim 1 is directed to a method for providing a speech recognition system to adjust to premature enunciator commands (Fig. 2; Page 9, Lines 11-12). In general, the method includes activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input (Fig. 2, Block 260; Page 10, Lines 13-18).

Independent Claim 8 –

Independent claim 8 is directed to a computer readable medium storing a computer program for a speech recognition system to adjust to premature enunciator commands (Page 2, Lines 17-18). The computer program comprises computer readable code for activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), computer readable code for receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), computer readable code for determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and computer readable code for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user input (Fig. 2, Block 260; Page 10, Lines 13-18).

Independent Claim 15 –

Independent claim 15 is directed to a system for providing speech recognition that adjusts to premature enunciator commands (Fig. 2; Page 10, Lines 17-18). The system includes a means for activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), a means for receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), a means for determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and a means for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input (Fig. 2, Block 260; Page 10, Lines 13-18).

Dependent Claim 20 –

Dependent claim 20 includes means for the speech recognition system to filter sound overlays from user commands (Fig. 2, Block 280; Page 10, Lines 23-25).

Independent Claim 21 –

Independent claim 21 is directed to a method of using a speech recognition system to adjust to commands of premature enunciators (Fig. 2; Page 9, Lines 11-12). The method comprises activating a speech recognition system (Fig. 2, Block 210; Page 9, Lines 14-15), indicating to the user that the system is ready to receive speech input (Fig. 2, Block 220; Page 9, Lines 20-21), listening for speech input after a predetermined time delay (Page 9, Lines 24-26), recognizing that the user has spoken before the system was ready to receive the speech input (Fig. 2, Block 230; Page 9, Line 27-29), and thereafter indicating to the user via a prompt that the system is again ready to receive speech input (Fig. 2, Block 230; Page 11, Lines 9-11), starting a listening period before the prompt is complete (Fig. 2, Block 260; Page 10, Lines 14-18), receiving the speech input (Fig. 2, Block 270; Page 10, Lines 19-21), and filtering the received speech input to remove noise residue due to the prompt (Fig. 2, Block 280; Page 10, Lines 23-25).

Although the Appellant has provided the summary of claimed subject matter with references to specific embodiments of the invention to comply with the requirements set forth in the relevant provisions of 37 C.F.R., this summary has been provided to aid the Board in evaluating the appeal and is not intended to limit the meaning or definition of any terms in the claims. Furthermore, it should be appreciated that the above-provided reference numerals and pages/line numbers are only for exemplary purposes, as other instances and/or embodiments of the claimed elements could appear elsewhere in the application.

(vi) Grounds of Rejection to be Reviewed on Appeal

The issues on appeal are as follows:

1) whether claims 1-5, 8-12, and 15-19 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George and Suominen;

2) whether claims 6, 7, 13, 14, and 20 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George, Suominen, and Dudemaine; and

3) whether claims 21-25 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George, Suominen, and Dudemaine.

(vii) Argument**Claims 1-5, 8-12, and 15-19 –**

Claims 1-5, 8-12, and 15-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Suominen. This rejection is respectfully traversed for at least the reason that the combined teachings of French-St. George and Suominen does not render obvious Appellant's limitation of adjusting the speech recognition system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.

Independent claim 1 recites "adjusting the [speech recognition] system after determining that the user has spoken prematurely to allow for earlier detection of user speech input." The Examiner has recognized and acknowledged that French-St. George does not disclose this step. To be sure, while French-St. George does disclose determining that a speech request was spoken too soon, see Fig. 10, it only teaches either commanding the user to repeat the request after the prompt (i.e., within the single established time window) or quitting the attempt to recognize speech input and switching the user to a touch screen input.

The Examiner has therefore relied upon Suominen to make up for the claim 1 subject matter missing from the primary reference. For that missing limitation, the Examiner cites a single portion of Suominen that is improperly taken out of context and interpreted unreasonably broadly for the sole purpose of supporting the Examiner's hindsight search for the missing limitation from French-St. George. In particular, the Examiner relies upon a single sentence in Suominen's paragraph [0083] which states that "Signal S_A may be asserted, with appropriate coding, whenever a change in the activation of speech recognition is desired." Taking this one statement and ignoring the remaining teachings of Suominen, the Examiner then concludes that it would have been obvious to "adjust" French-St. George's system to activate the speech recognition after detecting that the user has spoken prematurely to allow for earlier detection of user speech input. However, there is no basis from the references themselves, or that has been shown from the prior art generally, that would have led one of ordinary skill in the art to so modify the system of French-St. George. "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the

exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 U.S.P.Q. 391, 393 (C.C.P.A. 1965) (also quoted in Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 U.S.P.Q. 416, 419 (Fed. Cir. 1986)).

In the instant case, the citation identified by the Examiner is taught as part of a stylus-based input system in which the system is configured to determine when the stylus is being used for speech input (via a microphone in the stylus) or for freehand text input. The activation signal S_A noted by the Examiner is generated based on such things as orientation of the stylus relative to the incoming direction of sound and proximity to the user's head/mouth. See, for example, the remainder of Suominen's paragraph [0083] noted by the Examiner, as well as paragraph [0057] noted in Appellant's prior response, and also paragraphs [0059]-[0072].

There is no teaching or suggestion anywhere in Suominen that activation of speech recognition can be adjusted either after determination that a user has spoken prematurely or to allow for earlier detection of user input. Instead, a reasonable combination of Suominen's teachings with that of French-St. George would be to apply Suominen's stylus-based speech/freehand input to French-St. George's speech/touch screen input so that, for example, French-St. George's touch screen alternative input approach would be replaced by or possibly enhanced by Suominen's stylus-based freehand text input. But there is no reason in view of either of these references to adjust a speech recognition system after determining that a user has spoken prematurely to allow for earlier detection of speech input; rather, that teaching or suggestion comes only from Appellant's own disclosure. Accordingly, it is respectfully submitted that the rejection is improper and should be reversed.

Appellant has also supplied arguments in the amendment filed June 7, 2007 and those arguments are still deemed fully applicable. In the final Office Action, the Examiner did respond to some of those arguments, and that response bears some comment. In Appellant's amendment, it was argued that Suominen discloses speech recognition activation, which does not equal speech recognition adjustment, and that activation amounts to an on/off determination while adjustment relates to a degree to which already-activated speech recognition is performed. In responding, the Examiner stated that "it is well known in the art that a speech recognition system is capable of being adjusted while offline (not active) as well as online (active) [and] Suominen's

activation signal may be changed whenever a change in the activation signal is desired wherein the adjustment is provided by the desired change.” However, the Examiner’s response misses the point. The distinction being made by Appellant was not adjustment online versus offline, but that Suominen simply teaches activation/deactivation of the speech recognition, albeit under very specific conditions (angle of sound impingement, etc.), and not adjustment of the speech recognition system or adjustment of when that activation occurs. The Examiner has not pointed to any disclosure from Suominen in which the activation circuit 126 is adjusted to change the timing of the activation relative to a prompt or otherwise. Rather, that circuit only activates or deactivates speech recognition based on pre-established conditions. It is simply unreasonable for the Examiner to characterize turning on and off the system as “adjusting” the system, much less “adjusting” it after determining that a user has spoken prematurely, much less “adjusting” it to allow for earlier detection of user speech input.

The Examiner’s response also indicated that she has ignored the limitation that the system is adjusted “to allow for earlier detection of user speech input” because that language from the claim “is merely an intended use for the system.” This is legally incorrect. The language from the claim acts as a positive limitation on the last step. That step includes what, when, and how – the what being that the system is adjusted, the when being that it is adjusted after determining that the user has spoken prematurely, and the how being that it is adjusted to allow for earlier detection of user speech input. The Examiner has not provided any authoritative legal support for ignoring this limitation of the claim; to the contrary, the Examiner’s mention of “intended use” is suggestive of case law interpreting the effect of such language in preambles, not as a part of a method step in the body of the claim.

While the above arguments have been addressed to claim 1, they are equally valid when applied to the rejection of independent claim 8 involving a computer readable medium and to rejection of independent claim 15 involving a system cast in means plus function language. Furthermore, claims 2-5, 9-12 and 16-19 each ultimately depend from one of these claims and should be allowed therewith.

Claim 4 –

As noted above, claim 4 depends from claim 1 and should be allowed therewith. Furthermore, claim 4 is separately patentable in that it recites the steps of “the speech recognition system providing a prompt indicating that the system is ready to receive speech input, receiving the user speech input before the system has started a first listening period that begins after a delay following the prompt, and thereafter providing a subsequent prompt and starting a subsequent listening period at an earlier time relative to its prompt.” Neither reference teaches or suggests these steps. The Examiner asserts that “Suominen teaches starting a subsequent listening period at an earlier time relative to its prompt,” but again identifies only the one sentence from Suominen’s paragraph [0083] which, by a simple reading of the sentence says nothing about listening periods or timing of a listening period relative to a prompt. Again, as discussed above, the Examiner has taken this statement out of context and used it in a manner that would not have been obvious to one of ordinary skill in the art. Accordingly, claim 4 is separately patentable apart from its dependence on claim 1.

Claims 6, 7, 13, 14, and 20 –

Claims 6, 7 13, 14, and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Suominen and further in view of Dudemaine. As discussed in Appellant’s June 7, 2007 response, Dudemaine does not make up for the above-noted deficiencies of French-St. George and Suominen as they were applied to the base claims. Thus, these claims are patentable on the same basis as the independent claims from which they depend.

Claims 6, 13, and 20 are also separately patentable because they contain additional distinctions over the cited prior art. In particular, Appellant’s claims 6, 13 and 20 recite, *inter alia*, a speech recognition system that filters sound overlays from user commands. Dudemaine is different, as it teaches unwanted background noise, while Appellant filters a sound overlay that results from a voice command. More simply, a sound overlay is an automated prompt generated by the system--such as “Ready” or “Please speak”--mixed with the user’s speech as shown in block 280 of Appellant’s Fig. 2. Dudemaine discloses removing silences before, after, and in the middle of the speech signal. In comparison, claims 6, 13, and 20 disclose removing sound, not silence. While Dudemaine does also disclose filtering out unwanted background noise, it is

unreasonable to simply equate background noise with a sound overlay. Background noise is relatively unpredictable as compared to a sound overlay which is a known prompt having known characteristics. The Examiner argues that these terms are interchangeable and states that “background noise is anything not wanted in a signal.” Appellant disagrees with this statement. Situations exist where unwanted portions of a signal include data that is not background noise. For example, audio compression methods use sampling techniques that result in the removal of otherwise desirable data from signals. Audio engineers sacrifice this data, and the sound quality it provides, in an effort to conserve bandwidth. While this data isn’t wanted, it would be incorrect to call it background noise. As a result, the Examiner has failed to establish that background noise can be equated to a sound overlay.

Additionally, claims 7 and 14 disclose processing the filtered speech input, or processing the claimed subject matter of respective claims 6 and 13. Since Dudemaine fails to disclose filtering sound overlays, Dudemaine cannot then be interpreted as processing the filtered speech (i.e. speech input with the sound overlays removed). Thus, these claims are also separately patentable independent of their base claim.

Accordingly, Appellant respectfully submits that claims 6, 7, 13, 14, and 20 patentably define over French-St. George, Suominen, and Dudemaine, and requests that the rejection of these claims be reversed.

Claims 21-25 –

Claims 21-25 also stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Suominen and further in view of Dudemaine. This rejection is respectfully traversed because nowhere does French St. George, Suominen or Dudemaine teach or suggest either of the steps (f) and (h) of that claim; namely (1) starting a listening period before the prompt is complete following a prior recognition that the user has spoken before the system was ready to receive the speech, or (2) filtering the received speech input to remove noise residue due to the prompt. As discussed above, Suominen’s stylus-based activation approach does not teach or render obvious starting a listening period before a prompt for input is complete. The Examiner has failed to establish any reasonable support in Suominen that discloses this step. Nor has Appellant found any support in Suominen for either a listening period or starting a

listening period before the prompt is complete. Further, as discussed above, Dudemaine does not teach or suggest filtering received speech to remove noise residue due to the prompt. Rather, it teaches removing silences and background noise which one of ordinary skill in the art would not understand to include the prompt used to request the speech input.

Moreover, apart from not teaching or suggesting some of the steps of claim 21, the references do not teach or suggest Appellant's claimed combination of steps, which includes listening for speech input after a predetermined time delay, recognizing that the user has spoken before the system was ready to receive the speech input; and thereafter indicating to the user via a prompt that the system is again ready to receive speech input, and starting a listening period before the prompt is complete.

Accordingly, Appellant respectfully submits that the rejection of claim 21 is improper and should be reversed. Claims 22-25 each ultimately depend from claim 21 and should be allowed therewith.

Conclusion

In view of the foregoing, the Appellants request that the rejections of all claims be overturned and the claims be held allowable.

The Commissioner is authorized to charge any fees, or refund any overpayments, associated with this Appeal Brief to Deposit Account No. 07-0960.

Respectfully submitted,

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(viii) Claims Appendix

1. A method for a speech recognition system to adjust to premature enunciator commands, the method comprising:
 - activating the speech recognition system;
 - receiving speech input from a user before the system is ready to receive speech input;
 - determining that the user has spoken prematurely; and
 - adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.
2. The method of claim 1, wherein the speech recognition system is activated selectively by the user.
3. The method of claim 1, wherein the activation of the speech recognition system is followed by informing the user that the system is ready to receive input and a listening period wherein the speech recognition system is able to receive speech input.
4. The method of claim 1, further comprising the speech recognition system providing a prompt indicating that the system is ready to receive speech input, receiving the user speech input before the system has started a first listening period that begins after a delay following the prompt, and thereafter providing a subsequent prompt and starting a subsequent listening period at an earlier time relative to its prompt.
5. The method of claim 4, wherein the earlier listening period begins 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.
6. The method of claim 1, wherein the speech recognition system filters sound overlays from user commands.
7. The method of claim 6, further comprising processing filtered speech input through the speech recognition system.

8. A computer readable medium storing a computer program for a speech recognition system to adjust to premature enunciator commands comprising:

computer readable code for activating the speech recognition system;
computer readable code for receiving speech input from a user before the system is ready to receive speech input;
computer readable code for determining that the user has spoken prematurely; and
computer readable code for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user input.

9. The computer readable medium of claim 8, further comprising computer readable code to activate the speech recognition system selectively by the user.

10. The computer readable medium of claim 8, further comprising computer readable code for informing the user that the system is ready to receive input, and computer readable code for determining a listening period wherein the speech recognition system is able to receive speech input.

11. The computer readable medium of claim 8, further comprising computer readable code for the speech recognition system to start a listening period at an earlier predetermined time interval.

12. The computer readable medium of claim 11, further comprising computer readable code to begin the earlier listening period 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.

13. The computer readable medium of claim 8, further comprising computer readable code for filtering sound overlays from user commands.

14. The computer readable medium of claim 8, further comprising computer readable code to process filtered speech input through the speech recognition system.

15. A system for speech recognition that adjusts to premature enunciator commands, the system comprising:

- means for activating the speech recognition system;
- means for receiving speech input from a user before the system is ready to receive speech input;
- means for determining that the user has spoken prematurely; and
- means for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.

16. The system of claim 15, further comprising means for the user to selectively activate the speech recognition system.

17. The system of claim 15, wherein the means to activate the speech recognition system comprise means to inform the user that the system is ready to receive input, and means for a listening period wherein the speech recognition system is able to receive speech input.

18. The system of claim 15, further comprising the means for the speech recognition system to start the listening period at an earlier predetermined time interval.

19. The system of claim 18, further comprising means for the earlier listening period to begin 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.

20. The system of claim 15, further comprising the means for the speech recognition system to filter sound overlays from user commands.

21. A method of using a speech recognition system to adjust to commands of premature enunciators, the method comprising:

- (a) activating a speech recognition system;
- (b) indicating to the user that the system is ready to receive speech input;

- (c) listening for speech input after a predetermined time delay;
- (d) recognizing that the user has spoken before the system was ready to receive the speech input; and thereafter
- (e) indicating to the user via a prompt that the system is again ready to receive speech input;
- (f) starting a listening period before the prompt is complete;
- (g) receiving the speech input; and
- (h) filtering the received speech input to remove noise residue due to the prompt.

22. The method of claim 21, wherein the predetermined time delay comprises a temporal pause occurring between indicating that the system is ready to receive speech input and listening for user speech input.

23. The method of claim 21, wherein the starting step (f) begins 50-100ms before the prompt is complete.

24. The method of claim 21, further comprising carrying out a plurality of iterations of steps (a) through (d) prior to steps (e) through (h).

25. The method of claim 24, further includes determining whether a user has exceeded an error count associated with the plurality of iterations of steps (a) through (d).

(ix) Evidence Appendix

None.

(x) Related Proceedings Appendix

None.